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Biotechnology Notes

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Biotechnology Notes, a compilation of agency activities, news events, and upcoming meetings, is prepared for members of the U.S. Department of Agriculture's (USDA) Committee on Biotechnology in Agriculture (CBA) by USDA's Office of Agricultural Biotechnology (OAB).

INSIDE USDA

TO PLUCK OR NOT TO PLUCK

That question has bedeviled growers since time immemorial. Researchers, too, are curious about what controls fruit color, texture, and ripening. It is already known that textural changes of ripening fruit result from structural changes in the cell wall, and fruit color develops as a result of the activation of specific genes that control pigment biosynthesis. Understanding how each process is controlled is the aim of a team of researchers at the University of California under a grant from the Competitive Research Grants Office of the Cooperative State Research Service.

Using biotechnological techniques, the researchers are studying the structural changes in cell walls during tomato ripening. Their focus has been on the enzymes associated with cell wall loosening. Their approach is to identify, isolate, and clone genes for those enzymes, to construct transgenic tomatoes that contain the gene for a specific enzyme, and to see how the addition of the gene changes the fruit ripening process.

So far, they have identified one cell wall loosening enzyme, polygalacturonase, and have determined that it is not the most critical enzyme in the ripening process. They have also found at least two important regulatory factors of genes expressed during fruit ripening, a plant hormone -- ethylene -- and a group of small cell wall fragments. The team is now working on the next group of cell wall enzymes.

NEW RESEARCH GUIDELINES MOVE FORWARD

USDA's "Guidelines for Research Outside the Laboratory Involving Biotechnology" have been reviewed by the 13-member Agricultural Biotechnology Research Advisory Committee (ABRAC) and are now being routed to USDA agency heads for comment. In early May, members of the interdepartmental Biotechnology Science Coordinating Committee will also have an opportunity to review and comment on the guidelines. The final layer of review will be the Office of Management and Budget and then publication in the Federal Register. At that time, the public will have 30 days in which to submit comments. The guidelines provide the scientific basis for assuring the biosafety of field tests using genetically modified organisms. Unlike regulations, the guidelines are voluntary. Compliance with the guidelines does not preclude compliance with federal or state regulations.

FIGHTING FUNGUS WITH BIOTECHNOLOGY

Diseases of crop plants are caused by bacteria, viruses, nematodes, or fungi. Of these four groups of organisms, the fungi are considered to be the most devastating. Seventy percent of disease problems are fungal related. Fungi are also very tenacious, one reason why they have been around for about 300 million years. Now, researchers at the Agricultural Research Service's Plant Disease Resistance Unit at the University of Wisconsin, Madison, may be unlocking the mysteries of fungal diseases.

The scientists have focused their research on the fungus that causes corn smut. Although corn smut is not an extremely serious problem, the causative fungus, Ustilago maydis, is easier to manipulate at the molecular level than some others. Corn smut, therefore, will become a model for understanding the mechanics of fungal disease in other crop plants.

The team is studying the genes used during mating. Although single haploid cells (haploid, meaning they have one copy of genomic DNA in the cell) are not harmful, they become pathogenic after mating with other haploids. Why? Using DNA-mediated transformation in which DNA is removed from one cell, cloned, and moved into a new cell, the team found that when one allele of the b mating type locus is transferred to haploid cells carrying another allele of b, the cells become pathogenic. This finding has important implications for studying pathogenesis in the haploid, a much simplified system.

Once pathogenicity at the molecular level is fully understood, scientists may then be able to modify or even disarm pathogenicity genes. If successful, such a technique might be used on fungal pathogens of rice and other cereal crops that are especially vulnerable to fungal disease.

CRISIS MANAGEMENT PLANNING UNDERWAY

The Office of Agricultural Biotechnology (OAB) is coordinating the development of a Department-wide crisis response plan in the event of a biotechnology-related emergency. Such a plan would only apply to projects approved by USDA. The plan will address questions pertaining to public and environmental safety, media communications, and methods of evaluation. The plan should be in place in several months.

AROUND THE NATION (AND THE WORLD)

GETTING A HANDLE ON PATENT APPLICATIONS

An 11 percent increase in biotechnology patent applications for FY '88 has resulted in a large backlog for the Patent and Trademark Office (PTO). To help reduce this volume and improve the efficiency of the review process, the PTO is creating a Biotechnology Institute and hiring 36 more patent examiners. The Institute is a cooperative effort of government agencies and the private sector.

Its mission is to increase the legal and technical knowledge of biotechnology examiners, as well as provide the staff with better resources for keeping current. The Institute's board members, who are drawn from government, academia, trade and bar associations, will work closely with the PTO to identify current and future technological trends where training will be needed. The idea for a Biotechnology Institute was proposed by the Industrial Biotechnology Association.

EUROPEANS TRANSFER GENE TO WHEAT

French and Belgian researchers report success in adding a gene for antibiotic (kanamycin) resistance to several varieties of wheat. They also report finding expression of the foreign gene as a selectable marker. A solution of the gene was added to florets just after pollination using a pollen tube as a gene vector on the germinating female organ. The team hopes to use the same method on other cereals important to the European agricultural economy.

U.S. DOCUMENT DELIVERED TO PARIS

Good Developmental Practices for Small-Scale Field Releases, prepared by an interagency committee headed by FDA Commissioner Frank Young, was submitted in mid-April to the Paris headquarters of the Organization for Economic Cooperation and Development (OECD). This report details experimental conditions for good developmental practices for plants and animals. The United States volunteered to draft the document because OECD's 1986 report on recombinant DNA safety considerations did not include agricultural and environmental applications.

IN CASE YOU WEREN'T THERE

- About 80 people attended an APHIS-sponsored public hearing March 30 in Bethesda, Md., regarding the field testing of a **rabies vaccine** on three islands off the Virginia and South Carolina coasts. An environmental assessment prepared by APHIS found the proposed test to have no significant impact on the environment. At the hearing, a number of individuals spoke in support of the field test, including representatives from the American Park Rangers Association, the Southeastern Cooperative Wildlife Disease Study, six state public health departments, the Ontario (Canada) Rabies Advisory Committee, several wildlife groups in New Jersey and Pennsylvania, and state game agencies from Pennsylvania and South Carolina. An official from the National Wildlife Federation would not refute the test on scientific grounds, but argued the public should have more time to review the environmental assessment and the comments from the meeting before the trial is approved.

- The Office of Technology Assessment's 19-member advisory panel met April 17 to discuss the scope of three reports that will address the international **perspectives of biotechnology**. The reports are part of a 2-year study on Biotechnology in a Global Economy: Options for U.S. Strategy. Panelists were asked

to identify trends, develop criteria for making policy, and identify options. The first report concerns international investment. Questions were posed about how much the government spends on basic versus applied research, where the funds go, and who sets priorities for research projects. The second report will assess the international regulatory environment including intellectual property rights, export licensing, and trade agreements. The last study will discuss corporate strategies for international commercial biotechnology.

- Officials from USDA, the Congress, and Texas A&M University re-dedicated a building on the ARS campus in Beltsville, Md. April 21 for the study of plant molecular biology. Called the **Plant Molecular Biology Laboratory**, it will now be a focal point for genetic engineering at USDA.

In the days after prohibition, the building was used for wine research. Later, scientists pursued projects in seed physiology, phytochrome work, and hormone research. The building has since been gutted and totally outfitted for biotechnology research. Some of the projects to be carried out at the new facility include tissue culture work with peaches, soybean research, sugar beet expression, cereals, plant hormone expression, and new techniques to bypass conventional breeding. Six scientists and nine post-doctoral researchers will be the first occupants.

- The OAB hosted a seminar and reception April 24 for the **Society for Risk Analysis**. OAB Director Al Young gave an overview of biotechnology activities at USDA. Maryln Cordle, regulatory specialist on detail to OAB from the Food Safety and Inspection Service, discussed the content of USDA's proposed guidelines for researchers. Daniel Jones, OAB Deputy Director, described the Department's proposed handbook, a supplement to the guidelines. Finally, David MacKenzie, Director for the National Biological Impact Assessment Program, outlined the new databases that will track and collect information pertaining to biosafety research.

NEW PUBLICATIONS

Biocatalysis and Biomimetics, edited by James D. Burrington and Douglas S. Clark. ACS Symposium Series No. 392. April 1989. \$39.95. To order, call (800) ACS-5558.

Choices for the Heartland: Alternative Directions in Biotechnology and Implications for Family Farming, Rural Communities and the Environment, by Charles Hassebrook and Gabriel Hegyes. 1989. \$12.00 To order, call (515) 294-0938.

The Release of Genetically Engineered Microorganisms. Proceedings of symposium held in 1988 in Cardiff, Wales. 1988. \$59.50. To order, call Academic Press at (619) 699-6742.

"The Naked Intruder: USDA and the Discovery of the Viroid," by Steven M. Berberich. Copies of this 39-page illustrated pamphlet may be purchased from the National Technical Information Service, 5285 Port Royal Rd., Springfield, Va. 22161.

Perspectives in Biochemistry, Volume 1, by Hans Neurath. Published by the American Chemical Society. May 1989. \$14.95. To order, call (800) ACS-5558.

UPCOMING MEETINGS

May 1-3: Genetically Engineered Plants: Scientific Issues in Their Regulation for Animal Feed and Human Food Uses. Ithaca, N.Y. Sponsored by the Boyce Thompson Institute for Plant Research. For details, call Ralph Hardy at (607) 254-1300.

May 1-5: Recombinant DNA: Techniques and Applications. Sponsored by the American Type Culture Collection. Rockville, Md. For details, call (301) 231-5566.

May 4: Plant Breeding and Biotechnology: Issues and Options for Intellectual Property Rights. Arlington, Va. Sponsored by the American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America. For details, call Robert Barnes at (608) 273-8080.

May 8-11: Symposium on Rhizospheres. Beltsville, Md. Sponsored by USDA's Agricultural Research Service. Call Jim De Quattro at (301) 344-4296 for details.

May 8-12: 11th ORNL Symposium on Biotechnology for Fuels and Chemicals. Colorado Springs, Colo. Write to Edward D. Aebischer, Martin Marietta Energy Systems Inc., P.O. Box 2008, Oak Ridge, Tenn. 37831.

May 11-12: Pharmacokinetics Workshop. Sponsored by USDA's Food Safety and Inspection Service. Washington, D.C. For details, call (202) 447-8623.

May 16-19: 4th Annual Symposium on Biotechnology in the Pulp and Paper Industry. Raleigh, N.C. Call Jane Kohlman, USDA, Forest Service, Forest Products Laboratory, 1 Gifford Pinchot Dr., Madison, Wisc. 53705-2398.

May 16-19: Ecoinforma '89. The First International Congress and Exhibition on Environmental Information, Communication, and Technology Transfer. Bayreuth, West Germany. Sponsored, in part, by USDA's Office of Agricultural Biotechnology with Maryln Cordle and Jean Larson participating. For details, write to Dr. H. Fiedler, Ecological Chemistry, University of Bayreuth, P.O. Box 10 12 51, D-8580 Bayreuth, Federal Republic of Germany, or FAX 49 (921) 54626.

May 17: Food for the World Through Biotechnology. Chicago, Ill. Sponsored by the Industrial Biotechnology Association. For details, call Susan Racca at (202) 857-0244.

May 19-23: China Agri '89. Beijing, China. China's Ministry of Agriculture's first ag technology exhibition. Call Asia Marketing Associates at (508) 655-4000.

May 22-24: National Agricultural Biotechnology Council's "Biotechnology and Sustainable Agriculture: Policy Alternatives." Iowa State University. Call Walter Fehr at (515) 294-6865.

May 22-25: Third Annual Seminar on Analytical Biotechnology. Baltimore, Md. Write to Barr Enterprises, P.O. Box 279, Walkersville, Md. 21793.

May 30-31: Seventh Annual DECHEMA Meeting of Biotechnologists. Frankfurt am Main, West Germany. Write to DECHEMA, Abt. Tagungen, Postfach 97 01 46, D-6000 Frankfurt am Main 97, West Germany.

June 22-25: 1989 ASM Conference on Biotechnology. Orlando, Fla. For details, call Richard Bray at (202) 833-9680.

June 25-28: Second Symposium on the Genetic Engineering of Animals. Ithaca, N.Y. Sponsored by the Cornell University Biotechnology Program. For details, call William Hansel at (607) 253-3455.

June 25-28: Federal and State Regulation of Biotechnology: Plants and Microorganisms. Research Triangle Park, N.C. Sponsored by USDA's Animal and Plant Health Inspection Service. For details, call Shirley Ingebritsen at (301) 436-7602.

June 25-30: 5th International Symposium, World Association of Veterinary Laboratory Diagnosticians. Guelph, Canada. Call A. A. vanDreumel at (519) 823-8800.

Biotechnology Notes is written by Marti Asner, a public affairs specialist on assignment to OAB. Suggestions for items to include in future issues are always appreciated and may be sent to: USDA/OAB, 14th and Independence Ave., S.W., Room 321-A, Administration Bldg., Washington, D.C. 20250; or phone (202) 447-9165.

